

# **Regional Greenhouse Gas Initiative CO<sub>2</sub> Budget Trading Program**



## **Offset Project Monitoring and Verification Report Forms**

### **Landfill Methane Capture and Destruction**

**Version 1.0**

**Issued by CT Department of Environmental Protection**

**[www.ct.gov/dep](http://www.ct.gov/dep)**

**June 2009**

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## 1. Overview

To demonstrate the achievement of CO<sub>2</sub>-equivalent emissions reductions from a landfill methane capture and destruction offset project that has received a consistency determination from the Connecticut Department of Environmental Protection (“Department”), a Project Sponsor must submit to the Department in accordance with instructions (see accompanying instructions packet) a fully completed *Offset Project Monitoring and Verification Report – Landfill Methane Capture and Destruction Version 1.0* (“M&V Report”), consisting of the coversheet and all forms and related attachments. Following these instructions will ensure that the M&V Report contains all necessary information and is submitted properly.

The Project Sponsor should review the CO<sub>2</sub> Budget Trading Program regulations at section 22a-174-31a of the Regulations of Connecticut State Agencies (“RCSA”) addressing offset projects and the award of CO<sub>2</sub> offset allowances. All offset project submittal materials and documents are available at [www.ct.gov/dep/cwp/view.asp?a=2684&Q=440696&depNav\\_GID=1619](http://www.ct.gov/dep/cwp/view.asp?a=2684&Q=440696&depNav_GID=1619).

## 2. Submission Instructions

Please complete this form and supporting documents in accordance with section 22a-174-31a of the RCSA ([www.ct.gov/dep/lib/dep/air/regulations/mainregs/22a-174-31a.pdf](http://www.ct.gov/dep/lib/dep/air/regulations/mainregs/22a-174-31a.pdf)), the RGGI Model Rule ([www.rggi.org/model\\_rule\\_key\\_documents\\_link](http://www.rggi.org/model_rule_key_documents_link)) and these instructions to ensure the proper handling of your application. These instructions are not a substitute for the requirements of the relevant statutes and any regulations thereunder. You should review all applicable laws prior to completing this application. Remember, it is your responsibility to comply with all applicable laws. There is no fee associated with the submission of this application.

Submit one (1) complete paper hardcopy original and one (1) electronic copy of the M&V Report in the form of a CD disk. Submit hardcopies of forms requiring signatures as originally-signed copies and scan such signed forms for electronic submission. Facsimiles of the M&V Report are not acceptable under any circumstances.

ATTN: PAULA GOMEZ  
CO2 BUDGET TRADING PROGRAM  
BUREAU OF AIR MANAGEMENT  
CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION  
79 ELM STREET  
HARTFORD, CT 06106-5127

If you have any questions about this application, please contact Paula Gomez at [paula.gomez@ct.gov](mailto:paula.gomez@ct.gov) or at (860) 424-3088.

The M&V Report includes three parts, as described below. Each part comprises specified forms and required documentation. The M&V Report has been created as a Microsoft Word document with editable fields. Enter information directly in the fields provided or submit information or documentation as an attachment, as instructed. Include headers on all attachments indicating the form to which each is attached, the offset project name, and offset project ID code.

The Project Sponsor should save an electronic copy for his or her file to serve as a reference for any necessary remediation.

## 3. M&V Report Forms

The M&V Report consists of eight (8) forms divided into three parts, as follows:

### Part 1. General Information Forms

- Form 1.1 – Coversheet
- Form 1.2 – General Information

- Form 1.3 – Attestations
- Form 1.4 – Project Sponsor Statement
- Form 1.5 – Disclosure of Greenhouse Gas Emissions Data Reporting

**Part 2. Category-Specific Information and Documentation Forms**

- Form 2.1 – Demonstration of Conformance with M&V Plan
- Form 2.2 – Determination of Emissions Reduction

**Part 3. Independent Verification Form**

- Form 3.1 – Independent Verifier Certification Statement and Report

Note that although the forms include many embedded instructions, Project Sponsors are advised to consult the accompanying instructions packet for full instructions and documentation requirements.

**Offset Project Name**

**Offset Project ID Code**

**Form 1.1 – Coversheet**

**Project Sponsor (RGGI COATS Authorized Account Representative)**

**Project Sponsor Organization**

**Reporting Period**

**RGGI COATS General Account Name**

**RGGI COATS General Account Number**

Check the boxes below to indicate submission of the following required forms:

- ☐ Form 1.2 – General Information
- ☐ Form 1.3 – Attestations
- ☐ Form 1.4 – Project Sponsor Statement
- ☐ Form 1.5 – Disclosure of Greenhouse Gas Emissions Data Reporting
- ☐ Form 2.1 – Demonstration of Conformance with M&V Plan
- ☐ Form 2.2 – Determination of Emissions Reduction
- ☐ Form 3.1 – Independent Verifier Certification Statement and Report

**Offset Project Name****Offset Project ID Code****Form 1.2 – General Information****Project Sponsor (RGGI COATS Authorized Account Representative)****Telephone Number****Fax Number****Email Address****Street Address****City****State/Province****Postal Code****Country****RGGI COATS General Account Name****RGGI COATS General Account Number****Name of Offset Project****Project Commencement Date****Summary Description of Offset Project****Project City****Project County****Project State****Project Sponsor Organization****Primary Street Address****City****State/Province****Postal Code****Country****Brief Description of Project Sponsor Organization****Telephone Number****Website URL****Independent Verifier (Company/Organization)****States Where Verifier Accredited****Primary Street Address****Website URL****City****State/Province****Postal Code****Country****Point of Contact for Project****Contact Telephone Number****Contact Fax Number****Contact Email Address****Contact Street Address****City****State/Province****Postal Code****Country**

**Offset Project Name**

**Offset Project ID Code**

**Form 1.3 – Attestations**

The undersigned Project Sponsor certifies the truth of the following statements:

1. All offset projects for which the Project Sponsor or project sponsor organization has received CO<sub>2</sub> offset allowances, under the Project Sponsor's or project sponsor organization's ownership or control (or under the ownership or control of any entity which controls, is controlled by, or has common control with the Project Sponsor or project sponsor organization) are in compliance with all applicable requirements of the CO<sub>2</sub> Budget Trading Program in all participating states.
2. I certify under penalty of law that I have personally examined, and am familiar with, the statements and information submitted in this *M&V Report* and all its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the statements and information are to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false statements and information or omitting required statements and information, including the possibility of fine or imprisonment.

\_\_\_\_\_  
Signature of Project Sponsor

\_\_\_\_/\_\_\_\_/\_\_\_\_\_  
Date (MM/DD/YYYY)

\_\_\_\_\_  
Name of Project Sponsor (printed)

\_\_\_\_\_  
Title

\_\_\_\_\_  
Organization

\_\_\_\_\_  
Notary

**Offset Project Name**

**Offset Project ID Code**

### Form 1.4 – Project Sponsor Statement

The undersigned Project Sponsor hereby confirms and attests that the offset project upon which this Monitoring and Verification Report is based is in full compliance with all of the requirements of section 22a-174-31a of the RCSA. The Project Sponsor holds the legal rights to the offset project, or has been granted the right to act on behalf of a party that holds the legal rights to the offset project. The Project Sponsor understands that eligibility for the award of CO<sub>2</sub> offset allowances under section 22a-174-31a of the RCSA is contingent on meeting the requirements of section 22a-174-31a of the RCSA. The Project Sponsor authorizes the Department or its agent to audit this offset project for purposes of verifying that the offset project, including the Monitoring and Verification Plan, has been implemented as described in the *Consistency Application* that was the subject of a consistency determination by the Department. The Project Sponsor understands that this right to audit shall include the right to enter the physical location of the offset project and to make available to the Department) or its agent any and all documentation relating to the offset project at the Department's request. The Project Sponsor submits to the legal jurisdiction of Connecticut.

\_\_\_\_\_  
Project Sponsor signature

\_\_\_\_/\_\_\_\_/\_\_\_\_\_  
date (MM/DD/YYYY)

\_\_\_\_\_  
Project Sponsor name (printed)

\_\_\_\_\_  
Title

\_\_\_\_\_  
Organization

\_\_\_\_\_  
Notary



**Offset Project Name**

**Offset Project ID Code**

### Form 1.5 – Disclosure of Greenhouse Gas Emissions Data Reporting

Check the box below that applies:

- ☐ No greenhouse gas emissions data related to the offset project referenced in this *M&V Report* have been or will be reported to a voluntary or mandatory program other than the CO<sub>2</sub> Budget Trading Program.
- ☐ Greenhouse gas emissions data related to the offset project referenced in this *M&V Report* have been or will be reported to a voluntary or mandatory program other than the CO<sub>2</sub> Budget Trading Program. Information for all such programs to which greenhouse gas emissions data have been or will be reported is provided below.

**Name of Program to which GHG Emissions Data Reported**

Check all that apply:

- ☐ Reporting is currently ongoing
- ☐ Reporting was conducted in the past
- ☐ Reporting will be conducted in the future
- ☐ Reporting is mandatory
- ☐ Reporting is voluntary

**Enter Frequency of Reporting**

**Enter Reporting Start Date**

**Program Contact Information – Address**

**Program Website**

**Categories of Emissions Data Reported**

**Name of Program to which GHG Emissions Data Reported**

Check all that apply:

- ☐ Reporting is currently ongoing
- ☐ Reporting was conducted in the past
- ☐ Reporting will be conducted in the future
- ☐ Reporting is mandatory
- ☐ Reporting is voluntary

**Enter Frequency of Reporting**

**Enter Reporting Start Date**

**Program Contact Information – Address**

**Program Website**

**Categories of Emissions Data Reported**

Add extra pages as needed.

Offset Project Name

Offset Project ID Code

**Form 2.1 – Demonstration of Conformance with M&V Plan**

Using the checklist provided in the right hand column of the tables below, attach documentation that demonstrates that the required elements of the submitted M&V Plan described in the left hand column of the tables were performed. Indicate that the required documentation is provided as an attachment to Form 2.1 by checking the appropriate boxes. Each attachment must include a header that indicates it is an attachment to Form 2.1, identifies the number of the appropriate table and the reference number in the left-hand column of the table, and includes the offset project name and offset project ID code.

**Table 1. Quality Assurance/Quality Control (QA/QC) Program for Measuring Equipment**

<b>Procedures and Documentation Required by the M&amp;V Plan</b>	<b>Documentation Provided (check the boxes to indicate attachment of required documentation)</b>
<b>Quality Assurance/Quality Control (QA/QC) Program for Measuring Equipment</b>	
1. Procedures for recording names and contact information for: personnel responsible for recording measurements and data entry, QA/QC managers, and third party analytical laboratory	<input type="checkbox"/> Copy of the organizational structure of the landfill gas measurement and monitoring team, including names and contact information; contact information for third-party laboratory
2. Procedures for designated personnel to keep landfill gas sales records (in MMBtu or standard cubic feet), electricity sales records, records of measured heat rate of combustion device if applicable, and records of newly installed equipment and retired equipment	<input type="checkbox"/> List of specific procedures performed by designated personnel <input type="checkbox"/> Sales receipts showing amount of landfill gas (in MMBtu or standard cubic feet) or electricity (in kWh) sold <input type="checkbox"/> Copies of records of measured heat rate of combustion and equipment installation/retirement
3. Procedures for annual comparison of collected methane as measured by monitoring equipment with calculated methane used to generate electricity or calculated methane in landfill gas sold, noting any discrepancies	<input type="checkbox"/> Copy of annual comparison calculation, including data sources and assumptions
4. Calculation procedures for standardizing landfill gas flow that correct for documented site-specific temperature and pressure measurements (only necessary if landfill gas flow meter does not automatically adjust landfill gas measurement to standard units)	<input type="checkbox"/> Records of daily standardization calculations of landfill gas flow (to standard cubic feet) using daily site-specific measurements of temperature and pressure
5. Description of the contents of an annual quality control report describing the procedures taken to QA/QC landfill gas collection and monitoring equipment	<input type="checkbox"/> Annual quality control report that describes landfill gas collection system, updates or equipment changes, procedures taken to QA/QC landfill gas collection and monitoring equipment, findings of quarterly reviews, issues encountered, and remedial actions taken

Offset Project Name

Offset Project ID Code

**Table 2. Maintenance, Operation, and Calibration of Measuring and Monitoring Equipment**

<b>Procedures and Documentation Required by the M&amp;V Plan</b>	<b>Documentation Provided (check the boxes to indicate attachment of required documentation)</b>
<b><i>Maintenance, Operation, and Calibration of Measuring and Monitoring Equipment</i></b>	
<i>1. Landfill gas flow rate performance tests will be conducted at least monthly to ensure flow readings are being recorded at least every 15 minutes</i>	<input type="checkbox"/> <i>Copy of monthly performance tests</i> <input type="checkbox"/> <i>Copy of data for one sample day per month of flow meter readings recorded in intervals of at least 15 minutes</i>
<i>2. Monthly performance tests will be conducted to show that the accuracy of flow meter readings is within +/- 5 percent of manufacturer specifications</i>	<input type="checkbox"/> <i>Copy of monthly performance tests</i> <input type="checkbox"/> <i>List of specific procedures followed and equipment used to verify flow meter accuracy</i>
<i>3. Monthly performance tests will be conducted of methane concentration instrument showing that manufacturer specifications are met for precision and accuracy</i>	<input type="checkbox"/> <i>Copy of monthly performance tests</i> <input type="checkbox"/> <i>List of specific procedures followed and equipment used to verify methane concentration instrument accuracy and precision</i>
<i>4. Maintenance schedules for landfill gas flow meter and methane concentration instrument are performed in accordance with manufacturer recommendations and specifications</i>	<input type="checkbox"/> <i>Copies of maintenance schedules</i> <input type="checkbox"/> <i>Copy of manufacturer recommended maintenance schedule for landfill gas flow meter and methane concentration instrument (permanent and portable equipment)</i>
<i>5. Collected landfill gas flow rates and methane concentration recorded at least daily</i>	<input type="checkbox"/> <i>Copies of at least daily measured landfill gas flow rates and methane concentration</i>
<i>6. Records kept on a monthly basis of the number of hours that the landfill gas collection system was not in operation</i>	<input type="checkbox"/> <i>Records of monthly landfill gas collection system operation status (in hours per month)</i>
<i>7. Records kept on a monthly basis of the number of hours that the combustion device (e.g., flare, boiler, electricity generation unit) was not in operation</i>	<input type="checkbox"/> <i>Records of monthly combustion device operation status (in hours per month)</i>
<i>8. Records kept on a monthly basis of calculation of landfill gas flow rate standardization (in standard cubic feet per day) to correct for site-specific pressure and temperature measurements (only required if landfill gas flow meter does not automatically adjust landfill gas flow to standard units)</i>	<input type="checkbox"/> <i>Records of daily landfill gas flow rate calculation into standard cubic feet including site-specific pressure and temperature measurements</i>

Offset Project Name

Offset Project ID Code

**Table 2. Maintenance, Operation, and Calibration of Measuring and Monitoring Equipment (continued)**

<b>Procedures and Documentation Required by the M&amp;V Plan</b>	<b>Documentation Provided (check the boxes to indicate attachment of required documentation)</b>
9. Records kept on an annual basis of measured heat rate of combustion (in Btu/kWh) in accordance with manufacturer specifications for landfill gas, if applicable to the offset project (required for offset projects with an electric generation component)	<input type="checkbox"/> List of manufacturer specifications for combustion device heat rate (in Btu/kWh) <input type="checkbox"/> Copies of annual records from source tests showing the measured heat rate of combustion device
10. Records kept on a monthly basis on the amount of landfill gas combusted (in standard cubic feet) in the combustion device	<input type="checkbox"/> Copies of records of the monthly amount of landfill gas combusted (in standard cubic feet) in the combustion device
11. Records kept of calibration procedures for landfill gas flow monitoring equipment as specified by the manufacturer	<input type="checkbox"/> List of calibration activities and receipt of services rendered if performed by outside contractor <input type="checkbox"/> List of manufacturer specifications for landfill gas flow meter calibration
12. Records kept of calibration procedures for both portable and permanent methane concentration measurement equipment as specified by the manufacturer	<input type="checkbox"/> List of calibration activities and receipt of services rendered if performed by outside contractor <input type="checkbox"/> Calibration data from field measurements for methane concentration instrument <input type="checkbox"/> List of manufacturer recommendations for landfill gas concentration measurement equipment
13. Records kept of calibration schedules for landfill gas flow meter and methane concentration instrument (for both permanent and portable equipment) in accordance with manufacturer recommendations and specifications	<input type="checkbox"/> Copies of calibration schedule performed for landfill gas flow meter and methane concentration instrument (for both permanent and portable equipment)

Offset Project Name

Offset Project ID Code

**Table 3. Records Retention**

Procedures and Documentation Required by the M&V Plan	Documentation Provided (check the boxes to indicate attachment of required documentation)
<b>Records Retention</b>	
1. Document recordkeeping protocol that will be used to maintain record keeping throughout the duration of the offset project, including maintenance of an electronic index of all material to be collected, and storage procedures for such material	<input type="checkbox"/> Index of all project documentation materials collected during the reporting period

**Table 4. Independent Verification of Landfill Gas Methane Composition**

Procedures and Documentation Required by the M&V Plan	Documentation Provided (check the boxes to indicate attachment of required documentation)
<b>Independent Verification of Landfill Gas Methane Composition</b>	
1. Document process used to perform annual third-party laboratory analysis of sampled landfill gas using U.S. EPA-approved laboratory testing methods	<input type="checkbox"/> List of EPA-approved test procedure followed <input type="checkbox"/> Copy of third-party analysis report of sampled landfill gas and date of analysis
2. Document protocol used to ensure landfill gas samples taken at the same location as the landfill gas flow meter	<input type="checkbox"/> Signed documentation by sampling technician that methane concentration measurements were taken at location of landfill gas flow meter

**Offset Project Name**

**Offset Project ID Code**

### Form 2.2 – Determination of Emissions Reduction

Provide documentation of CO<sub>2</sub>-equivalent emissions reductions during the reporting period. Attach a spreadsheet documenting the calculations and data sources used to determine CO<sub>2</sub>-equivalent emissions reductions, volume of methane collected, and mass of methane per standard cubic foot. The attachment must include a header that indicates it is an attached to Form 2.2 and includes the offset project name and offset project ID code

Enter calculated values:


Emissions reductions (tons CO<sub>2</sub>e)

Volume of methane collected (scf)

Mass of methane (lbs/scf)

**Offset Project Name**

**Offset Project ID Code**

### Form 3.1 – Independent Verifier Certification Statement and Report

An accredited independent verifier must sign and date the form. Attach the accredited verifier report. The attached verifier report must include a header that indicates it is an attachment to Form 3.1 and includes the offset project name and offset project ID code.

**Name of Accredited Independent Verifier**

I certify that the accredited independent verifier identified above reviewed this *M&V Report*, including all forms and attachments, in its entirety, including a review of the following:

1. The verifier has reviewed the entire *M&V Report* and evaluated the contents of the report in relation to the applicable requirements of section 22a-174-31a of the RCSA and the required information that must be provided in the *M&V Report*.
2. The verifier has evaluated the adequacy and validity of information supplied by the Project Sponsor to determine CO<sub>2</sub>-equivalent emissions reductions in accordance with subsection 22a-174-31a(d) of the RCSA, and the required documentation that must be provided in the *M&V Report*.
3. The verifier has evaluated the adequacy and consistency of methods used by the Project Sponsor to quantify, monitor, and verify CO<sub>2</sub>-equivalent emissions reductions in accordance with the requirements of subsection 22a-174-31a(d) of the RCSA and the Monitoring and Verification Plan submitted as part of the *Consistency Application*.

A verification report is attached that documents the verifier's review of the items listed above and includes evaluation conclusions and findings.

\_\_\_\_\_  
Signature of Verifier Representative

\_\_\_\_/\_\_\_\_/\_\_\_\_  
Date (MM/DD/YYYY)

\_\_\_\_\_  
Name of Verifier Representative (printed)

\_\_\_\_\_  
Title

\_\_\_\_\_  
Notary